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EXAMINER

FLEURANTIN, JEAN B

| ART UNIT | PAPER NUMBER |
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2172

DATE MAILED: 10/21/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

24

Office Action Summary

Application No.

09/263,068

Applicant(s)

PECHENY, BORIS

Examiner

Jean B Fleurantin

Art Unit

2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-15 and 21-30 is/are allowed.
- 6) ☒ Claim(s) 1-5, 16-20, 31-35 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Claim 37 is added.

Claims 1-35 and 37 remain pending for examination. And Examiner discusses the newly added limitations of claim 37 in the following rejection.

Response to Applicant's Remarks

2. Applicant's arguments filed July 30, 2003 with respect to claims 1-35 and 36 have been fully considered but they are not persuasive. Because of the following:

In response to applicant's argument on pages 13-15, that "neither Li et al. nor Rangajan et al., individually or in combination, teach the elements of the claims." The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Li discloses "a method of searching for a string in a lexical cache" as a means of comparing the representation of the unverified string with representations of only those lexicon entries that are commonly indexed to a selection of the buckets to which the unverified string is indexed, (see col. 2, lines 61-65), "generating a key based on the string" as the step of indexing the entries preferably comprises determining a set of group numerical values, (see col. 3, lines 8-11);

"selecting the lexical container for an entry associated with the string based on the key" as a pointer 42 to the signature vector's entry 45 in the lexicon is stored in a bucket 43 associated

Art Unit: 2172

with the bucket address equal to the decimal number of the group, (see col. 8, lines 2-4). Li does not explicitly disclose a length of the key, and wherein at least one of the lexical containers is configured to hold a different maximum number of entries than at least another one of the lexical containers. However, Rangarajan discloses the page indexing module 127 then creates the word key for the word this includes determining 1011 the number k of n-grams for the word, the number k of n-grams for the word key is length of the word-2, (see col. 12, lines 38-48), the page key offset 511 is a offset to the start of the variable length page key 509 corresponding to the table entry, the page key size 513 is the total number of the bytes in the corresponding page key 509 including all the entries for n- gram and k values, (see col. 9, lines 30-34); further, in column 6, lines 11-12, Rangarajan discloses the document list 225 stores a variable number of entries 311 up to maximum limit. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Li and Rangarajan with a length of the key, and wherein at least one of the lexical containers is configured to hold a different maximum number of entries than at least another one of the lexical containers. Such modification would allow the teachings of Li and Rangarajan to improve the performance of the lexical cache, and to provide an indexing system that allows indexed documents to efficiently added or removed from the system for searching without substantial overhead for reindexing, (see col. 2, lines 13-16).

Applicant stated that on page 16, Rangarajan fails to disclose, "selecting a lexical container from among a plurality of lexical containers based on a length of the key." It is respectively submitted that Rangajan reference discloses the claimed limitations as follow: Rangarajan discloses the page indexing module 127 then creates the word key for the word this

Art Unit: 2172

includes determining 1011 the number k of n-grams for the word, the number k of n-grams for the word key is length of the word-2, (see col. 12, lines 38-48); further, in column 6, lines 11-12, Rangarajan discloses the document list 225 stores a variable number of entries 311 up to maximum limit. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Li and Rangarajan with a length of the key, and wherein at least one of the lexical containers is configured to hold a different maximum number of entries than at least another one of the lexical containers. Such modification would allow the teachings of Li and Rangarajan to improve the performance of the lexical cache, and to provide an indexing system that allows indexed documents to efficiently added or removed from the system for searching without substantial overhead for reindexing, (see col. 2, lines 13-16).

In response to applicant's arguments on page 16, against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 31-35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,774,588 issued to Li et al. (hereinafter "Li") in view of U.S. Patent No. 5,706,365 issued to Rangarajan et al. (hereinafter "Rangarajan").

As per claims 1 and 16, Li discloses "a method of searching for a string in a lexical cache" as a means of comparing the representation of the unverified string with representations of only those lexicon entries that are commonly indexed to a selection of the buckets to which the unverified string is indexed, (see col. 2, lines 61-65), "generating a key based on the string" as the step of indexing the entries preferably comprises determining a set of group numerical values, (see col. 3, lines 8-11);

"selecting the lexical container for an entry associated with the string based on the key" as a pointer 42 to the signature vector's entry 45 in the lexicon is stored in a bucket 43 associated with the bucket address equal to the decimal number of the group, (see col. 8, lines 2-4). Li does not explicitly disclose a length of the key, and wherein at least one of the lexical containers is

Art Unit: 2172

configured to hold a different maximum number of entries than at least another one of the lexical containers. However, Rangarajan discloses the page indexing module 127 then creates the word key for the word this includes determining 1011 the number k of n-grams for the word, the number k of n-grams for the word key is length of the word-2, (see col. 12, lines 38-48), the page key offset 511 is a offset to the start of the variable length page key 509 corresponding to the table entry, the page key size 513 is the total number of the bytes in the corresponding page key 509 including all the entries for n- gram and k values, (see col. 9, lines 30-34). Further, in column 6, lines 11-12, Rangarajan discloses the document list 225 stores a variable number of entries 311 up to maximum limit. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Li and Rangarajan with a length of the key, and wherein at least one of the lexical containers is configured to hold a different maximum number of entries than at least another one of the lexical containers. Such modification would allow the teachings of Li and Rangarajan to improve the performance of the lexical cache, and to provide an indexing system that allows indexed documents to efficiently added or removed from the system for searching without substantial overhead for reindexing, (see col. 2, lines 13-16).

As per claims 2, 4, 17 and 19, Li discloses “wherein steps of generating a key based on the string includes the step of compressing the string to produce the key” as a means of indexing of the lexicon entries produces a fixed result for a given lexicon, (see col. 3, lines 27-28).

Art Unit: 2172

As per claims 3 and 18, Li discloses “wherein steps of compressing the string to produce the key includes the step of performing an n-gram compression on the string” as a means of partitioning a representation of an entry comprises forming an n-gram vector representing the entry folding the n-gram vector into a signature vector of reduced bit length, (see col. 3, lines 1-4); further, in column 14, lines 49-50, Li teaches folding said n-gram vector into a signature vector by combining multiple n-gram into bits.

As per claims 5 and 20, the limitations of claims 5 and 20 are rejected in the analysis of claim 1, and these claims are rejected on that basis.

As per claims 31 and 32, in addition to the discussion in claim 1, Li further discloses storing the string in an entry in the lexical container based on the key, (see col. 6, lines 42-46).

As per claims 33 and 34, in addition to the discussion in claim 1, Li further discloses “the first lexical container is configured to hold more entries than the second lexical container” as a second portion of the lexicon comprising some of the entries of the first portion by directly comparing an encoded representation of the unverified string with encoded representations of the entries of the first portion of the lexicon, (see col. 4, lines 29-33).

As per claims 35, Li discloses “searching for one of the entries associated with a string within one of the plurality of lexical containers corresponding to a key generated based on the string” as the search executive 123 retrieves 1107 the bank index 223 for the current bank 217

Art Unit: 2172

and then invokes the search execution module 129 to perform a preprocessing 1109 operation, which preprocessing 1109 identifies those pages within the current bank 217 that match any n-grams in the search query words that satisfy the matching, (see col. 14, lines 43-48). Li does not explicitly disclose, "allocating a plurality of lexical containers each configures to contain a respective maximum number of entries based on a function that includes a term that is inversely proportional to a logarithm of a key length associated with the lexical containers". However, Rangarajan discloses the page indexing module 127 then creates the word key for the word this includes determining 1011 the number k of n-grams for the word, the number k of n-grams for the word key is length of the word-2, (see col. 12, lines 38-48), the page key offset 511 is a offset to the start of the variable length page key 509 corresponding to the table entry, the page key size 513 is the total number of the bytes in the corresponding page key 509 including all the entries for n-gram and k values, (see col. 9, lines 30-34); further, in column 6, lines 11-12, Rangarajan discloses the document list 225 stores a variable number of entries 311 up to maximum limit. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Li and Rangarajan with allocating a plurality of lexical containers each configures to contain a respective maximum number of entries based on a function that includes a term that is inversely proportional to a logarithm of a key length associated with the lexical containers. Such modification would allow the teachings of Li and Rangarajan to improve the performance of the lexical cache, and to provide an indexing system that allows indexed documents to efficiently added or removed from the system for searching without substantial overhead for reindexing, (see col. 2, lines 13-16).

Art Unit: 2172

As per claims 37, Li discloses, “wherein the step of searching the selected lexical container includes searching only the selected lexical container”, (see col. 6, lines 42-46).

Allowable Subject Matter

4. Claims 6-15 and 21-30 are allowed.

The following is an examiner's statement of reasons for allowance:

As per claims 6-14 and 21-29, the present application has been thoroughly reviewed. Upon extensive diverse databases searches, and a full review of applicant arguments, the examiner deems that the claimed features “identifying a hash table from among a plurality of hash tables based on the length of the key, said hash table containing sequences of slots for holding entries associated with strings, each of said sequences of slots corresponding to respective hash value, wherein at least one of the hash tables is configured to hold a different number of slots than at least another one of the hash table” in conjunction with other elements of the claims would not found anticipated or obvious over the prior art made of record.

As per claims 15 and 30, the present application has been thoroughly reviewed. Upon extensive diverse databases searches, and a full review of applicant arguments, the examiner deems that the claimed features “each of said sequences of slots corresponding to a respective hash value and a number of the slots being based on a respective key length, wherein at least one of the hash tables is configured to hold a different number of slots than at least another one of the hash tables” in conjunction with other elements of the claims would not found anticipated or obvious over the prior art made of record.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2172

Contact Information

6. Any inquiry concerning this communication from examiner should be directed to Jean Bolte Fleurantin at (703) 308-6718. The examiner can normally be reached on Monday through Friday from 7:30 A.M. to 6:00 P.M.


If any attempt to reach the examiner by telephone is unsuccessful, the examiner's supervisor, Mrs. KIM VU can be reached at (703) 305-8449. The FAX phone numbers for the Group 2100 Customer Service Center are: After Final (703) 746-7238, Official (703) 746-7239, and Non-Official (703) 746-7240. NOTE: Documents transmitted by facsimile will be entered as official documents on the file wrapper unless clearly marked "DRAFT".

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 2100 Customer Service Center receptionist whose telephone numbers are (703) 306-5631, (703) 306-5632, (703) 306-5633.


Jean Bolte Fleurantin

2003-10-10

JBF/


SHAHID ALAM
PRIMARY EXAMINER